

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 9793-2-1 (1991): Antennas for the Reception of Sound and Television Broadcasting in the Frequency Range 30 MHz to 1 GHz, Part 2: Requirements, Section 1: Guide for the Preparation of Antenna Performance Specifications [LITD 7: Audio, Video and Multimedia Systems and Equipment]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



भारतीय मानक

(Reaffirmed 2004)

30 मीहज से 1 गेहज की बारबारता रेंज में ध्वनि तथा
दूरदर्शन प्रसारण की ग्रहणशीलता में एन्टेना — विशिष्टि

भाग 2 अपेक्षाएँ

अनुभाग 1 एन्टेना कार्यकारिता तैयार करने के लिए मार्गदर्शिका

(पहला पुनरीक्षण)

Indian Standard

ANTENNAS FOR THE RECEPTION OF
SOUND AND TELEVISION BROADCASTING
IN THE FREQUENCY RANGE 30 MHz TO
1 GHz — SPECIFICATION

PART 2 REQUIREMENTS

Section 1 Guide for the Preparation of Antenna Performance Specifications

(*First Revision*)

UDC 621.396.67 : 621.397

© BIS 1991

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

November 1991

Price Group 2

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Radio Communications Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

The object of this standard (Part 2) is to lay down the essential requirements for antennas for the reception of sound and television broadcasting.

This standard was originally published in 1983 and is being revised now in the light of experience gained. In this revision, it has now been decided to bring out the requirements in different section, each section dealing with a specific type of antenna such as Yagi antenna for TV Reception, Indoor Antenna, etc. This section only provides standard format for individual antenna specification sheets.

This standard shall be read in conjunction with IS 9793 (Part 1/Sec 1 to 3) : 1991. Antennas for the reception of sound and television broadcasting in the frequency range 30 MHz to 1 GHz : Part 1 Methods of measurement, Section 1 Electricals and mechanical characteristics, Section 2 Methods of tests of electrical performance parameters, Section 3 Methods of tests for mechanical properties and television environmental tests.

While preparing this standard, assistance has been derived from IEC Pub 597-4(1983) Aerials for the reception of sound and television broadcasting in the frequency range 30 MHz to 1 GHz : Part 4 Guide for the preparation of aerial performance specifications detailed specification sheet format, issued by the International Electrotechnical Commission (IEC).

Indian Standard

ANTENNAS FOR THE RECEPTION OF SOUND AND TELEVISION BROADCASTING IN THE FREQUENCY RANGE 30 MHz TO 1 GHz — SPECIFICATION

PART 2 REQUIREMENTS**Section 1 Guide for the Preparation of Antenna Performance Specifications***(First Revision)***1 SCOPE**

1.1 This standard (Part 2/Sec 1) applies to linearly polarized receiving antenna as (aeriels) for domestic use in the frequency range 30 MHz to 1 GHz.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

<i>IS No.</i>	<i>Title</i>
9793 (Part 1/Sec 1 to 3) : 1991	Antennas for the reception of sound and television broadcasting in the frequency range 30 MHz to 1 GHz : Part 1 Methods of measurement, Section 1 Electrical and mechanical characteristics Section 2 Methods of tests of electrical performance parameters Section 3 methods of tests for mechanical properties and environmental tests

3 OBJECT

3.1 The object of this standard (Part 2/Sec 1) is to ensure uniformity in the presentation of antenna performance specifications and to provide a standard format for individual antenna specification sheets.

4 BANDWIDTH

4.1 The bandwidth of an antenna for the reception of sound and television broadcasting cannot be specified as a unique value in megahertz. The same antenna may have a different bandwidth for each of the parameters on which a bandwidth needs to be specified.

In 4.6 of IS 9793 (Part 1/Sec 1) : 1991 four separate definitions of bandwidth characteristics are given: gain bandwidth (4.6.1), directivity protection bandwidth (4.6.2), impedance bandwidth (4.6.3) and cross-polarization protection bandwidth (4.6.4).

In each of these definitions the bandwidth of the antenna is the extent of a continuous range of frequencies over which the relevant parameter does not vary by more than a specified amount.

In general each of these parameters will cover a different frequency range, therefore, the operating bandwidth of an antenna as defined in 4.6.5 of IS 9793 (Part 1/Sec 1) : 1991 should be specified to guide the user.

All bandwidths shall be expressed by specifying their lower and upper frequencies.

Gain, directivity protection and cross-polarization protection are all of great importance in determining the quality of performance especially in antennas intended for the reception of more than one programme channel and in areas where co-channel interference is possible.

As indicated in 4.2.3 of IS 9793 (Part 1/Sec 2) : 1991 the gain of the antenna in decibels shall be expressed in graphical form as a gain-frequency plot.

A general guide for the gain variations, referred in 4.6.1 of IS 9793 (Part 1/Sec 1) : 1991, specifying gain bandwidth, is given in Table 1 for typical clauses of antenna service for domestic use.

Table 1 General Guide for Gain Variations for Domestic Antennas

(Clause 4.1)

Sl No.	Antenna Type	Single-Channel Width (MHz)	Service	Band	Frequency Range (MHz) (see Note 1)	Maximum Gain Variation (dB)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Single channel	7 MHz	Television	VHF	47-68 Band I	± 2
ii)	Multichannel		Television	VHF	174-230 Band II	± 2 (see Note)
iii)	FM multichannel		Sound	VHF	88-108 MHz	± 4
iv)	Multichannel coverage	<200MHz	Television	UHF	470-854 Band IV	± 1.5
v)	Multichannel coverage	200 MHz to 300 MHz	Television	UHF	470-854 Band IV	± 2 (see Note)
vi)	Multichannel coverage	>300 MHz	Television	UHF	470-854 Band IV	± 3 (see Note)

NOTE — It is suggested that the gain variation over any single channel should not exceed ± 1.5 dB.

5 ANTENNA REFLECTION COEFFICIENT

5.1 This is defined in 4.14 of IS 9793 (Part 1/ Sec 1) : 1991 for an antenna connected to a feeder having the same characteristic impedance as the nominal design impedance of the antenna.

It can be measured by the methods described in 4.1 of IS 9793 (Part 1/Sec 2) : 1991. The nominal design impedance of antenna shall be stated in the specification sheet.

As a general guide for domestic antennas, the reflection coefficient referred to the terminals of an installed antenna should not exceed the values given in Table 2 over the specified gain-bandwidth.

Table 2 General Guide for Reflection Coefficient for Domestic Antennas

(Clause 5.1)

Sl No.	Class of Service of Antenna	Magnitude of Maximum Reflection Coefficient	Maximum SWR	Return Loss Ratio (dB)
(1)	(2)	(3)	(4)	(5)
i)	Single-channel VHF/TV (Band I, II)	0.33	2	9.5
ii)	Multichannel VHF (47-230 MHz)	0.83	4	4.4
iii)	Multichannel VHF/TV (174-230 MHz)	0.5	3	6.0
iv)	Single channel VHF/TV (174-230 MHz)	0.43	2.5	7.3
v)	Multichannel UHF TV (470-854 MHz)	0.43	2.5	7.3

6 DIRECTIVITY PROTECTION

6.1 This is an important parameter in evaluating the ability of an antenna to reject co-channel interference and should be quantified in the antenna specification realistically in relation to the class of service for which the antenna is required.

The upper three curves in Fig. 1 indicate the overall radiation pattern envelope which is assumed for planning purposes.

In order to meet this requirement in built-up areas in the presence of perturbation by reflections, the performance of the receiving antenna measured with unperturbed signals should be well within the limits indicated.

An example of the antenna performance desirable to achieve good protection at the fringe of a UHF service is given in the bottom curve in Fig. 1.

7 CROSS-POLARIZATION PROTECTION

7.1 This characteristic is important in areas where orthogonal polarization is used to reduce co-channel interference. It will also reduce the unwanted effects of reflected signals.

The achievable discrimination will depend on the design of the antenna.

The level of cross-polar radiation in any azimuth direction should be at least 20 dB below the co-polar radiation in the direction of the main lobe. Lower cross-polar radiation, that is, better cross-polarization protection, should

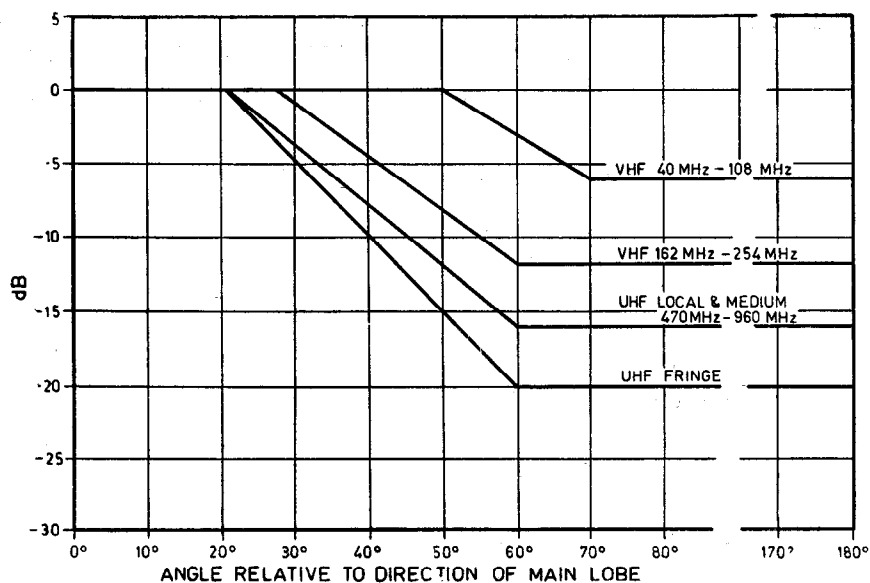


FIG. 1 ANTENNA RADIATION PATTERN ENVELOPE

be achievable except with very simple antenna. Where, higher values are included in the antenna specification they should be regarded as mandatory minima.

8 DETAILED SPECIFICATION SHEET FORMAT

8.1 IS 9793 (Part 1/Sec 1) : 1991 lists the essential properties which shall be specified

where necessary in the antenna specification sheet. To assist in providing uniformity of domestic antenna specifications a standard format is given in Annex A.

It should be noted that the inclusion or emission of data in this specification sheet, and the quantification of any other data may be determined by agreement between the manufacturer and the user.

ANNEX A

(Clause 8.1)

AERIAL SPECIFICATION SHEET FORMAT

(Aerial Type)

(Model No.)

(Frequency range [Channel coverage])

Construction :

Dimensions

Assembled

Overall length (mm)

Maximum width (mm)

Maximum height (mm)

Assembled mass (kg)

Accessories contained in the package

Electrical Specification :

IS 9793 (Part 1)	
Section	Clause Ref.

*Data***Tests**

Gain	(dB)
Gain variation	(dB)
E plane beamwidth	(degrees)
H plane beamwidth	(degrees)
Terminal impedance	(ohm)
Reflection coefficient	
E plane directivity protection	(dB)
H plane directivity protection	(dB)
Cross-polarization protection	(dB)
Impedance bandwidth	(MHz)
Directivity-protection bandwidth	(MHz)
Cross-polarization bandwidth	(MHz)
Operating bandwidth	(MHz)
Gain bandwidth	(MHz)

Mechanical Specifications :

Maximum safe wind velocity (m/s)
Wind load (N) at specified wind velocity (m/s)
Wind load with ice (N) at specified wind velocity (m/s)
Ice load (N)
Terminal device strength
Type of terminal device

Environmental Tests :**Tests**

Vibration
Salt mist
Industrial atmosphere
Weatherproofing
Dry heat test at 55 degree C
Cold test at -10 degree C

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director Publications), BIS.

Revision of Indian Standards

Indian Standards are reviewed periodically and revised, when necessary and amendments, if any, are issued from time to time. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition. Comments on this Indian Standard may be sent to BIS giving the following reference:

Doc : No. LTD 20 (1255)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
(Common to all Offices)

Regional Offices :

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002

Telephone

{ 311 01 31
 331 13 75

Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola
CALCUTTA 700054

37 86 62

Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036

53 38 43

Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113

235 02 16

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
BOMBAY 400093

6 32 92 95

Branches : AHMADABAD, BANGALORE, BHOPAL, BHUBANESHWAR, COIMBATORE,
FARIDABAD, GHAZIABAD, GUWAHATI, HYDERABAD, JAIPUR, KANPUR,
PATNA, THIRUVANANTHAPURAM.